

pacific **ENSO** *update*

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**A Quarterly Bulletin of the Pacific El Niño/Southern Oscillation Applications Climate (PEAC) Center
Providing Information on Climate Variability for the U.S.-Affiliated Pacific Islands**

<http://www.prh.noaa.gov/peac>

CURRENT CONDITIONS

After relaxing during the middle of 2010, La Niña was back in full force by October 2011, with weather patterns across the Pacific similar to those that had dominated during the strong La Niña event of 2010. During the first half of 2011, La Niña conditions faded to ENSO-neutral. Rainfall was near-normal or above-normal at most locations. Abundant rainfall finally returned to Kapingamarangi Atoll near the equator, where it had been very dry for the last 5 months of 2010 and the first two months of 2011. During the 3rd Quarter months of July, August and September, the weather patterns across Micronesia seemed to be returning to those more typical of the summer: monsoonal southwest winds pushed eastward into Guam and the CNMI, and a few monsoon depressions formed in the region eastward from Palau through the longitudes of Guam and Chuuk.

During September, the basin became quite active for tropical cyclones, with a total of nine numbered tropical cyclones active in the basin at some time during the month. The typhoons were still displaced to the north and west, however, with the Philippines and the Ryukyu Islands bearing the brunt of their inclement weather. During October, tropical cyclone activity abruptly entered a quiet phase throughout the basin as La Niña once again became established. The east wind anomalies of La Niña ended the monsoon flow across Micronesia, and stifled all further tropical cyclone development. The odd collapse of tropical cyclone activity seen for much of the past decade was back, with anomalous easterly surface winds found along the equator from the International Date Line to the Philippine Islands. This is an unusual pattern because in the boreal fall, westerly surface winds typically begin their push further to the east at low latitudes in Micronesia. In the South Pacific, several of the island groups experienced very dry conditions. Tuvalu and the islets of Tokelau Atoll were extremely dry, and the U.S. Coast Guard was involved in a mission to deliver water to Tokelau. American Samoa was also very dry, and wild fires were a problem there in September.

Hawaii has also reentered into very dry conditions. This is due to above normal temperatures and below normal rainfall throughout the 3rd Quarter of 2011 (please see the Hawaii Local Summary for more information). Drought conditions still persist and have even worsened on the Big Island and on Maui in the past few months. Rainy conditions in early November have been welcomed across the state. Additionally, relief may be in

sight as the NOAA Climate Prediction center indicates that probabilities favor above-normal precipitation during early 2012 as a part of the forecast mature phase of La Niña.

The following comments from the **EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION** were posted on the U.S. Climate Prediction Center web site on October 06, 2011:

“ENSO Alert System Status: La Niña Advisory

Synopsis: La Niña conditions are expected to gradually strengthen and continue through the Northern Hemisphere winter 2011-12.

During September 2011, La Niña conditions strengthened as indicated by increasingly negative sea surface temperature (SST) anomalies across the eastern half of the equatorial Pacific Ocean. The weekly Nino indices continued their cooling trend and all are currently at or below -0.5°C . Consistent with this cooling, oceanic heat content (average temperature anomalies in the upper 300m of the ocean) remained below-average in response to a shallower thermocline across the eastern Pacific Ocean. Also, convection continued to be suppressed near the Date Line, and became more enhanced near Papua New Guinea. In addition, anomalous low-level easterly and upper-level westerly winds persisted over the central tropical Pacific. Collectively, these oceanic and atmospheric patterns reflect the continuation of La Niña conditions.

Currently, La Niña is not as strong as it was in September 2010. Roughly one-half of the models predict La Niña to strengthen during the Northern Hemisphere fall and winter. Of these models, the majority predict a weak La Niña (3-month average in the Nino-3.4 region less than -0.9°C). In addition, a weaker second La Niña winter has occurred in three of the five multi-year La Niñas in the historical SST record since 1950. However, the NCEP Climate Forecast System (CFS.v1) predicts a moderate-strength La Niña this winter (between -1.0°C to -1.4°C) and CFS.v2 predicts a strong La Niña (less than -1.5°C), which rivals last year's peak strength. For CFS forecasts made at this time of year, the average error for December-February is roughly $\pm 0.5^{\circ}\text{C}$, so there is uncertainty as to whether this amplitude will be achieved. Thus, at this time, a weak or moderate strength La Niña is most likely during the Northern Hemisphere winter.”

SEA SURFACE TEMPERATURES

During September 2011, La Niña conditions strengthened as indicated by increasingly negative sea surface temperature (SST) anomalies across the eastern half of the equatorial Pacific Ocean. The weekly Nino indices continued their cooling trend and all are currently at or below -0.5°C . Consistent with this cooling, oceanic heat content (average temperature anomalies in the upper 300m of the ocean) remained below-average in response to a shallower thermocline across the eastern Pacific Ocean. Also, convection continued to be suppressed near the Date Line, and became more enhanced near Papua New Guinea. In addition, anomalous low-level easterly and upper level westerly winds persisted over the central tropical Pacific. Collectively, these oceanic and atmospheric patterns reflect the continuation of La Niña conditions.

SOUTHERN OSCILLATION INDEX

The 3-month average of the Southern Oscillation Index for the 3rd Quarter of 2011 was +0.8, with monthly values of +1.0, +0.4 and +1.0 for the months of July, August, and September 2011, respectively. These positive SOI values, in addition to negative sea surface temperature readings, indicate the presence of a La Niña event in the tropical Pacific Ocean. Currently, this La Niña event is not as strong as it was at the end of September 2010.

Normally, positive SOI values in excess of +1.0 are associated with La Niña conditions, and negative SOI values below -1.0 are associated with El Niño conditions. Low SOI values suggest a weak coupling between the ocean and the atmosphere. The SOI is an index representing the normalized sea-level pressure difference between Darwin, Australia and Tahiti, respectively.

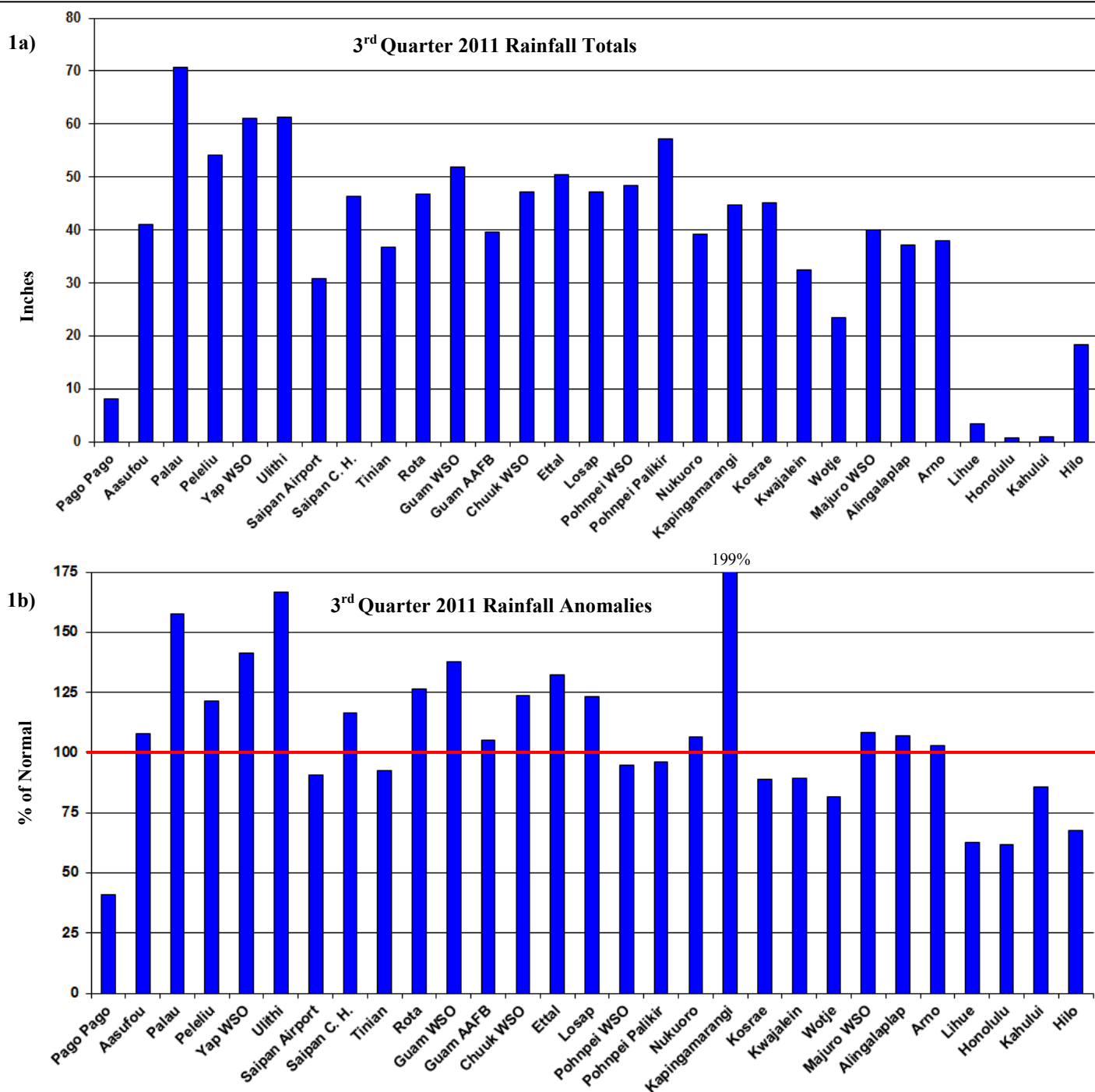


Figure 1, above. 3rd Quarter 2011 rainfall totals (a) in inches and (b) anomalies (expressed as % of normal).

TROPICAL CYCLONE

The PEAC Center archives western North Pacific tropical cyclone numbers, track coordinates, and 1-minute average maximum sustained wind taken from operational warnings issued by the Joint Typhoon Warning Center (JTWC) of the U. S. Air Force and Navy, located at Pearl Harbor, Hawai'i. Western North Pacific tropical cyclone names are obtained from warnings issued by the Japan Meteorological Agency (JMA), which is the World Meteorological Organization's Regional Specialized Meteorological Center (RSMC) for the western North Pacific basin. The PEAC archives South Pacific tropical cyclone names, track coordinates, central pressure, and 10-minute average maximum sustained wind estimates from advisories issued by the Tropical Cyclone Warning Centers at Brisbane, Nadi, and Wellington. The numbering scheme and the 1-minute average maximum sustained wind estimates are taken from warnings issued by the JTWC. There are sometimes differences in the statistics (e.g., storm maximum intensity) for a given tropical cyclone among the agencies that are noted in this summary.

Tropical Cyclone Summary

After a substantial rebound of tropical cyclone activity in the western North Pacific through September 2011, the basin activity entered an odd state of near collapse as La Niña became reestablished in October 2011. Through the end of October, the JTWC numbered 23 tropical cyclones in the western North Pacific Basin with the JMA providing names for 20 of these. This is now below normal. The eastern North Pacific has had 12 cyclones numbered by the National Hurricane Center (Miami), with 10 of these named. During 1979 through 2000 there were typically 18 named tropical cyclones in the eastern North Pacific, a statistic that has now fallen to 15.6 (when the 30-year averaging period is shifted to include the recent quiet decade of the 2000's). The central North Pacific has had no named tropical cyclones.

A recently released summary of TC activity in the western North Pacific provided by Paul Stanko, the senior forecaster at the Guam WFO, includes TS Banyan (23W), which lasted from 10 October to 14 October. Banyan spun up in the Republic of Palau and was first named to the west of Koror in the Philippine Sea. It moved west-northwestward most of its life, crossing over extreme northern Mindanao and several of the Visaya islands in the Philippines. It then turned north and dissipated over open water, never exceeding the 35 knot threshold for a minimal tropical storm. Although we have not yet had a 24W, it is worth noting that the Very-Early, Early and Near-Normal quintiles windows have closed. So, 24W will be either in the Late or Very Late categories this year. So far this year, our activity versus normal for 7 October is: **(1) Numbered tropical cyclones (TD or higher):** 23 vs. 26.42 or 87.1% of normal (was 94.0% on Oct 7), **(2) Named tropical cyclones (TS or higher):** 19 vs. 22.91 or 82.9% of normal (was 88.9% on Oct 7), **(3) Typhoons or higher:** 11 vs. 14.79 or 74.4% of normal (was 85.5% on Oct 7), **(4) Super Typhoons (130 kt or more):** 4 vs. 3.47 or 115% of normal (was 134% on Oct 7).

For the remainder of the season, Paul Stanko provides the following forecast: The regression forecast is for 28 significant tropical cyclones, which is in the Below-Normal quintile. (The previous forecast on 7 October was for 30 TC's, as was the forecast on 28 August, which is in the Near-Normal quintile). The R^2 for this regression is 0.915. The 95% confidence interval is now 23 to 32 TC's inclusive, with all past forecasts and re-forecasts falling within the 95% confidence interval. Note that we can no longer be 95% confident that we will have at least one more TC!

The Southern Hemisphere cyclone season of 2011-2012 will start soon. From 01 July 2011 to date, there have been no numbered tropical cyclones in the Southern Hemisphere. Activity in the Southern Hemisphere usually begins to trend upward in November with a long-term average of 1.5 cyclones experienced during November and 33 in December. The peak month for Southern Hemisphere tropical cyclones is February with a long-term average of 6.6 numbered cyclones. The Australian Bureau of Meteorology (BoM) issued the following outlook for the 2011-12 South Pacific Seasonal Outlook for Tropical Cyclones:

"The outlook for the 2011-2012 tropical cyclone season calls for a westward shift in tropical cyclone activity. This season there is a 65% chance that the Western Pacific Region [Coral Sea] will see more than the average number of tropical cyclones (35% chance of fewer than average) and a 40% chance that the Eastern Pacific Region [encompassing American Samoa] will see above average number (or a 60% chance that fewer cyclones will form). This outlook is based upon the status of the El Niño - Southern Oscillation (ENSO) over the preceding July to September period. During this period in 2011, neutral to borderline La Niña conditions were present. Historically, these conditions have favored a westward shift in tropical cyclone activity in the South Pacific."

The Australian Bureau of Meteorology (BoM) is also predicting an above average number of tropical cyclones for all regions across northern Australia during the 2011-2012 cyclone season.

PEAC Center Tropical Cyclone Outlook

The TC activity forecasts issued by Paul Stanko now have a very high level of skill for the remaining months of the year. Given the available guidance¹, the PEAC Center anticipates that the tropical cyclone activity for the remainder of 2011 will end up below normal for the western North Pacific basin and in Micronesia. It had been near normal for much of the year, but with the recent entry of the climate state into La Niña, the next two months should yield only two or three more numbered cyclones, which (including the one TC during October) will drop the year-end total to less than 30, pushing 2011 TC activity to below normal. There is a good chance (30%) that there may be no further tropical cyclones in Micronesia. The level of threat for any late season cyclone (though lower than average) is highest in the western side of the region (i.e., Guam, the CNMI, Yap and Palau). For the Southern Hemisphere, tropical cyclones should be distributed similarly to last year with activity pushed to the west. The three Australian TC regions (East Coast, Northern Coast, and Northwest Coast) are all anticipated to have higher than normal activity, with reduced activity east of the Coral Sea. The level of threat to individual islands is included in their local variability summaries.

¹ The PEAC tropical cyclone forecasts for 2011 are based on forecasts of the status of ENSO and input from three seasonal outlooks for tropical cyclone activity in the western North Pacific basin: (1) The Guam Weather Forecast Office (WFO), (2) The City University of Hong Kong Laboratory for Atmospheric Research, under the direction of Dr. J. C.-L. Chan, and (3) The Benfield Hazard Research Centre, University College London, Tropical Storm Risk (TSR) research group, UK, led by Dr Adam Lea and Professor Mark Saunders.

LOCAL SUMMARY AND FORECAST



American Samoa: American Samoa has now passed through the height of its dry season. It was very dry at Pago Pago during the dry season, with a 3-month 2011 3rd Quarter total rainfall of only 8.08 inches (41% of normal). In the typically wetter location of Aasufou, July and September were dry, but were balanced by a wet August so that the 3-month JJA total rainfall of 41.02 inches ended up near normal (108%). During this past dry season, brush fires were reported on the islands of Ofu and Tutuila. Dry streams were also noted. Dry conditions also extended across other island groups in the region. A joint New Zealand and United States operation provided emergency water supplies to drought-stricken Tokelau. The US Coastguard cutter WALNUT (home ported in Honolulu) met with the New Zealand team in Pago Pago, and from there traveled to Tokelau's three main atolls to bring supplies of fresh water. New Zealand was also responding to an ongoing water shortage emergency in Tuvalu. Strong trade winds and cooler-than-normal SST likely suppressed rainfall at most locations throughout American Samoa and helped to push the SPCZ to the west.

American Samoa Rainfall Summary 3rd Qtr 2011						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predict-ed ¹
Pago Pago WSO	Inches	2.31	3.85	1.92	8.08	18.70
	% Norm	37%	57%	29%	41%	95%
Aasufou	Inches	9.60	29.36	2.06	41.02	36.13
	% Norm	84%	234%	15%	108%	95%

¹ Predictions made in 2nd Quarter 2011 newsletter.

Climate Outlook: American Samoa has just passed through the heart of its dry season with mostly below-normal rainfall. Rainfall has already increased during October to over 8 inches at Pago Pago, nearing its monthly normal of 10.79 inches. Climate models and simple persistence of current conditions favor a continuation of below-normal rainfall through December, as is typical for this region. However, regional rainfall outlooks for the next three months place American Samoa near a sharp gradient of forecast rainfall, with below-normal rainfall to its north and east and above-normal rainfall to its south and west. La Niña conditions persisting through the first few months of 2012 should favor tropical cyclone activity in the Coral Sea from northeast Australia across to Fiji, with a below normal risk of cyclone development near, or south of American Samoa beginning in late November 2011.

Predicted rainfall for American Samoa from October 2011 through September 2012 is:

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²
Oct - Dec 2011 (Onset of Rainy Season)	85% (29.40 inches - Pago Pago)
January - March 2012 (Heart of Next Rainy Season)	100%
April - Jun 2012 (Onset of Next Dry Season)	95%
July - October 2012 (Heart of Next Dry Season)	90%

² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.

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LOCAL SUMMARY AND FORECAST



Guam/CNMI: Throughout Guam and the CNMI, the rainfall during the 3rd Quarter of 2011 was mostly above normal, with many locations throughout these islands experiencing 130% to 150% of average rainfall. For the first time in several years, monsoonal southwesterly winds persisted for many days, accompanied by some heavy showers and thunderstorms. Some of the basin's tropical cyclones formed to the north and west of Guam, helping to maintain the unsettled southwesterly airstream. The only reported below-normal 3rd Quarter rainfall occurred at the Saipan International Airport, where the 3-month total of 30.85 inches was 90% of normal. The reading of 58.03 inches (154%) at the mid-Guam location of Sinajaña was the highest 3rd Quarter total recorded throughout Guam and the CNMI. A round of thunderstorms during the early morning hours of 2 September dumped 5 to 7 inches of rain across Guam in only a few hours. Minor street flooding inconvenienced morning commuters. This was the heaviest 24-hour total experienced since typhoon Chaba dumped 7 to 9 inches across Guam during the night of 22 August 2004.

On the afternoon of Friday 15 October 2011 a fisherman was killed by a lightning strike. Edward Cruz San Nicolas was electrocuted while fishing off the reef near Paseo De Susana in Hagåtña. According to Pacific Daily News files, the last time a

Guam and CNMI Rainfall Summary 3rd Qtr 2011						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predict-ed ¹
Guam						
GIA (WFO)	Inches	20.54	15.00	16.37	51.91	45.30
	% Norm	195%	109%	121%	138%	120%
AAFB	Inches	9.50	12.41	17.71	39.62	45.19
	% Norm	87%	92%	118%	105%	120%
Dededo (Ypapao)	Inches	16.44	15.68	17.42	49.54	47.94
	% Norm	140%	107%	116%	124%	120%
Ugum Watershed	Inches	16.26	19.05	19.99	55.30	45.30
	% Norm	154%	139%	148%	146%	120%
Sinajaña	Inches	17.97	18.11	21.95	58.03	45.30
	% Norm	171%	132%	163%	154%	120%
CNMI						
Saipan Intl. Airport	Inches	11.20	12.26	7.39	30.85	40.92
	% Norm	138%	98%	55%	90%	120%
Capitol Hill	Inches	12.57	16.49	17.26	46.32	47.69
	% Norm	140%	132%	128%	132%	120%
Tinian Airport	Inches	10.32	13.94	12.42	36.68	47.69
	% Norm	115%	112%	92%	105%	120%
Rota Airport	Inches	10.20	17.64	18.94	46.78	44.40
	% Norm	113%	134%	142%	126%	120%

¹ Predictions made in 2nd Quarter 2011 newsletter.

LOCAL SUMMARY AND FORECAST

person on Guam was killed by a lightning strike was 2003, when a tourist was killed while swimming in Tumon. During another thunderstorm in the early morning hours of 27 October, lightning temporarily knocked-out the Guam police radio system, and police were forced to use their personal cell phones to communicate until about 10 a.m.

Climate Outlook: The rainy season has nearly run its course on Guam and across the CNMI. With the return of La Niña, the rainfall should average near or slightly above normal for the next few months as trade winds increase, and rainfall amounts begin to decrease. La Niña has ushered in substantial low-level easterly wind anomalies to the low latitudes, which effectively prevents the formation of tropical cyclones across most of Micronesia. The PEAC Center is cautiously optimistic that no tropical cyclones will adversely impact Guam or the CNMI for the remainder of the year. There may be one or two more cyclones that form to the south of the islands, but pass safely to the west before intensifying to a typhoon or tropical storm. The chances for extremes of rainfall (4 or more inches of rain in 24 hours) are similarly reduced. The rainfall distribution for the upcoming year should be similar to that of the year just past: a continuation of mostly near-normal to wetter-than-normal conditions.

Predicted rainfall for the Mariana Islands from October 2011 through September 2012 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²	
	Guam/Rota	Saipan/Tinian
Oct – Dec 2011 (End of Rainy Season)	120% (30.76 inches)	110% (24.27 inches)
Jan – March 2012 (Onset of Next Dry Season)	110%	115%
Apr – June 2012 (2nd half of Next Dry Season)	100%	100%
July - September 2012 (Next Rainy Season)	120%	110%

² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.

**Federated States of Micronesia:**

Yap State: All Yap Island locations were very wet during the 3rd Quarter of 2011, with most locations receiving a 3-month total of over 55 inches. Also during the 3rd Quarter, monthly rainfall totals were 20 inches or more during each of July, August and September at one or more of the Yap Island recording stations. Twenty inches or more rainfall during a month is relatively rare on Yap Island with only 4.4% of all months in the Yap WSO 55-year climate record (1953-2007) at or above 20 inches. In that record, there were 4 (7.3%), 9 (16.3%) and 2 (3.6%) occurrences of 20 inches or more during the months of July, August and September, respectively. At Ulithi, rainfall was similarly abundant with a 3rd Quarter total of 61.21 inches (167%). Ulithi's monthly rainfall totals during July and August were in excess of 20 inches. Woleai was the only location in Yap State that reported below normal rainfall during the 3rd Quarter. Aside from the abundance of rainfall, the weather at Yap Island and the atolls of Yap State was otherwise unremarkable during the 3rd Quarter of 2011.

LOCAL SUMMARY AND FORECAST

Yap State Rainfall Summary 3rd Qtr 2011						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predict- ed ¹
Yap Island						
Yap WSO	Inches	20.84	19.16	21.03	61.03	43.25
	% Norm	143%	126%	138%	141%	100%
Dugor	Inches	21.08	18.05	21.13	60.25	43.25
	% WSO	145%	119%	139%	139%	100%
Gilman	Inches	20.12	18.12	17.73	55.97	43.25
	% WSO	138%	119%	116%	129%	100%
Luweech	Inches	20.56	19.51	18.69	58.76	43.25
	% WSO	141%	128%	123%	136%	100%
Maap	Inches	24.27	16.12	21.49	61.88	43.25
	% WSO	167%	106%	141%	143%	100%
North Fanif	Inches	21.85	17.21	22.16	61.22	43.25
	% WSO	150%	113%	145%	142%	100%
Rumung	Inches	17.97	13.37	16.27	47.61	43.25
	% WSO	123%	88%	107%	110%	100%
Tamil	Inches	20.15	15.39	19.81	55.35	43.25
	% WSO	138%	101%	130%	128%	100%
Outer Islands						
Ulithi	Inches	20.91	22.02	18.28	61.21	36.76
	% Norm	169%	170%	159%	167%	100%
Woleai	Inches	7.19	6.71	9.88	23.78	40.30
	% Norm	58%	446%	84%	59%	100%

¹ Predictions made in 2nd Quarter 2011 newsletter.

Climate Outlook: With La Niña once again in control of the Pacific Basin climate, Yap State should remain wetter than normal for the foreseeable future. With the recent collapse of western North Pacific tropical cyclone activity, we would expect low odds (5-10%) for a damaging tropical cyclone to affect any location in Yap State for the remainder of the year. That being said, Yap State, Palau, Guam and the CNMI are the only locations in Micronesia that have a non-negligible chance to be affected by a named tropical cyclone for the remainder of 2011 through January 2012. The sea level typically rises above normal during La Niña, and higher sea level during the next three to six months could exacerbate coastal erosion and inundation during episodes of high surf.

Predicted rainfall for Yap State from October 2011 through September 2012 is as follows:

**For more information on weather and climate
in the Federated States of Micronesia go to**
<http://www.prh.noaa.gov/pohnpei/>
 Or
<http://www.prh.noaa.gov/yap/yapClimate.php>

LOCAL SUMMARY AND FORECAST

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²	
	Yap and Ulithi	Woleai
October – December 2011 (End of Rainy Season)	120% (36.49 inches)	90% (32.27 inches)
January – March 2012 (Heart of Next Dry Season)	110%	95%
April – June 2012 (Onset of Next Rainy Season)	110%	95%
July – September 2012 (Heart of Next Rainy Season)	120%	90%

² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.

Chuuk State: Rainfall was abundant throughout Chuuk State during the 3rd Quarter of 2011. Three-month rainfall totals of 45-50 inches were common. Two atolls in the Mortlock Island group (Nama and Ettal) topped the 3rd Quarter rainfall distribution with 52.30 inches and 50.52 inches respectively. The only sites to record below normal rainfall during the 3rd Quarter were Polowat (on the western side of Chuuk State) and Piis Panew (an islet on the north side of the Chuuk Lagoon). Other than the continuation of abundant rainfall across Chuuk State, the weather was otherwise unremarkable.

Chuuk State Rainfall Summary 3rd Qtr 2011						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predicted ¹
Southern Mortlocks						
Lukunoch	Inches	17.20	12.78	15.79	45.77	38.20
	% WSO	142%	88%	137%	120%	100%
Ettal	Inches	14.99	17.06	18.47	50.52	38.20
	% WSO	124%	117%	160%	132%	100%
Ta	Inches	11.79	23.24	13.87	48.90	38.20
	% WSO	97%	160%	120%	128%	100%
Namoluk	Inches	14.98	12.10	13.86	40.94	38.20
	% WSO	124%	83%	120%	107%	100%
Northern Atolls						
Fananu	Inches	12.93	11.73	11.60	36.26	45.84
	% WSO	107%	81%	101%	95%	120%
Onoun	Inches	21.26	11.38	13.49	46.13	45.84
	% WSO	176%	78%	117%	121%	120%
Northern Mortlocks						
Losap	Inches	19.60	10.37	17.13	47.10	38.20
	% WSO	162%	71%	149%	123%	100%
Nama	Inches	20.00	15.94	16.36	52.30	38.20
	% WSO	165%	109%	142%	137%	100%
Western Atolls						
Polowat	Inches	8.14	5.93	10.42	24.49	34.38
	% WSO	58%	40%	79%	58%	90%

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LOCAL SUMMARY AND FORECAST

Chuuk Lagoon						
Chuuk WSO	Inches	14.98	18.46	13.76	47.20	38.20
	% Norm	124%	127%	119%	124%	100%
Piis Panew	Inches	9.00	11.08	8.26	28.34	38.20
	% WSO	74%	75%	72%	74%	100%

¹ Predictions made in 2nd Quarter 2011 newsletter.

Climate Outlook: With La Niña back in control of the Pacific Basin climate, abundant rainfall should continue for the foreseeable future throughout Chuuk State. The weather patterns during the remainder of 2011 and through the first few months of 2012 are anticipated to be analogous to the atmospheric weather patterns seen during 2010 and early 2011 when easterly winds and tranquil (though wet) weather persisted. There are negligible odds (< 5%) for a named tropical cyclone to affect Chuuk State for the remainder of 2011 through early 2012. This represents a below normal risk of hazardous effects from tropical cyclones.

Because of the easterly wind anomalies now dominating the low-level wind pattern across Micronesia and the equatorial Pacific, the sea level should be above normal, and sea-level anomalies may approach high levels seen in the region over the past three years. Higher-than-normal sea level will expose the atolls of Chuuk State to a heightened risk of sea inundation, especially from late November and December 2011 through the boreal winter months of January, February and March. During these months, the extra-tropical low pressure systems that move eastward from Japan generate large northerly swells that move south from their North Pacific origin and pass through Chuuk State. If the surf from this swell is large enough (> 12 ft), coastal sea inundations can be expected, especially when the moon is in a new or full phase.

Predictions for Chuuk State from October 2011 through September 2012 are as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²			
	Chuuk Lagoon, and Nama	Polowat	Northern Atolls	Mortlocks
Oct – Dec 2011	120% (42.66 inches)	85% (30.22 in)	120% (42.66 in)	110% (39.11 in)
Jan – Mar 2012	110%	90%	100%	110%
Apr – June 2012	115%	90%	110%	115%
Jul – Sep 2012	110%	95%	120%	105%

² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.

Pohnpei State: Weather conditions on Pohnpei Island and most of the atolls of Pohnpei State during the 3rd Quarter of 2011 were generally unremarkable. Rainfall was near normal at most locations. Water supplies and stream flow were reported to be adequate. As usual, Palikir topped the list of rainfall totals in Pohnpei State during the 3rd Quarter of 2011 with 57.19 inches

LOCAL SUMMARY AND FORECAST

(104%). The extreme drought at Kapingamarangi broke in March 2011 when 8.46 inches of rain fell. Since then it has been unusually wet there, with the 3rd Quarter rainfall total nearly double the normal. High surf was recently experienced on Pohnpei Island, likely the result of increased trade wind strength upstream of the island. An unusual occurrence of a waterspout was reported on the afternoon of October 13th.

Pohnpei State Rainfall Summary 3rd Qtr 2011						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predicted ¹
Pohnpei Island						
Pohnpei WSO	Inches	14.27	19.61	14.44	48.32	50.98
	% Norm	78%	119%	90%	95%	100%
Palikir	Inches	15.43	21.77	19.99	57.19	59.55
	% Norm	78%	122%	115%	104%	100%
Kolonias Airport	Inches	13.29	15.73	14.92	43.94	41.85
	% Norm	92%	115%	113%	105%	100%
Atolls of Pohnpei State						
Nukuoro	Inches	13.96	13.06	12.19	39.21	36.75
	% Norm	97%	115%	111%	107%	100%
Pingelap	Inches	10.50	14.24	5.21	29.95	46.08
	% Norm	66%	96%	35%	65%	100%
Mwoakilloa	Inches	26.23	12.42	15.93	54.58	45.87
	% WSO	165%	84%	106%	119%	100%
Kapingamarangi	Inches	20.80	13.21	10.64	44.65	19.11
	% Norm	199%	214%	181%	199%	85%

¹ Predictions made in 2nd Quarter 2011 newsletter.

Climate Outlook: With La Niña back in control of the Pacific Basin climate, persistent easterly winds have become established across Micronesia. In this weather pattern, a rather narrow trade-wind Convergence zone forms, and is accompanied by a concentration of rainclouds in an east-west band (i.e., the ITCZ) that is typically located between 4° to 8° N. This is especially true for the months of April and May when Pohnpei Island usually experiences its highest monthly average rainfall. Near normal rainfall is anticipated on Pohnpei Island and the atolls of Pohnpei State for the next several months. The period of April through June 2012 could be very wet on Pohnpei Island and some of the atolls. We are cautiously watching the rainfall at Kapingamarangi which could again fall well below normal as the cold SST of La Niña works back westward along the equator into the longitudes of Pohnpei State.

During La Niña, the sea level typically rises above normal. For the next three to six months, above-normal sea level could exacerbate inundation and coastal erosion during episodes of high surf. Also, brisk easterly winds may develop rough water in the lagoons of atolls, and inside the fringing reef of Pohnpei Island. Areas prone to wave splash at high tide (e.g., the Pohnpei Island airport causeway) may experience more than usual erosive wave action.

LOCAL SUMMARY AND FORECAST

No typhoons or tropical storms are anticipated to adversely affect Pohnpei State during for the remainder of 2011 through the first half of 2012.

Predicted rainfall for Pohnpei State from October 2011 through September 2012 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²	
	Pohnpei Island and atolls	Kapingamarangi
Oct - Dec 2011	100% (47.68 inches)	90% (19.58 inches)
Jan - Mar 2012	100%	60%
Apr - Jun 2012	115%	90%
Jul - Sep 2012	100%	100%

² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.

Kosrae State: For most of 2011, Kosrae has been drier than normal. To date in 2011, only two months (May and August) have had above-normal rainfall and only May exceeded 20 inches. In a typical year, 4 or 5 months exceed 20 inches at the Kosrae Airport. The 3rd Quarter total at the airport of 45.13 inches was 89% of normal. At just under 6° N latitude, Kosrae is not normally affected by La Niña's reduction of rainfall near the equator, but the extensive tongue of cold SST during the 2010 La Niña may have contributed to dryness in the early part of 2011 when Kapingamarangi, Nukuoro, the western islands of Kiribati, and Nauru all experienced dry conditions. Persistent dryness at Kosrae later in 2011 was not shared by other locations in the region, and may simply be an artifact of the meso-scale nature of tropical rainfall.

Kosrae State Rainfall Summary 3rd Qtr 2011						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predicted ¹
Airport (SAWRS)	Inches	12.98	17.33	14.82	45.13	50.70
	% Norm	76%	105%	86%	89%	100%
Utwa	Inches	13.08	16.77	13.43	23.28	50.70
	% SAWRS	77%	102%	78%	85%	100%
Nautilus Hotel	Inches	12.59	15.97	14.23	42.49	50.70
	% SAWRS	74%	98%	83%	84%	100%
Tofol	Inches	15.69	18.19	9.74	43.62	50.70
	% SAWRS	92%	110%	57%	86%	100%

¹ Predictions made in 2nd Quarter 2011 newsletter.

Climate Outlook: For the next several months, persistent trade winds should dominate in Kosrae and throughout eastern Micronesia. This is typically associated with near-normal rainfall in

LOCAL SUMMARY AND FORECAST

Kosrae. It is worth noting that computer forecast guidance for the rainfall at Kosrae for the final three months of 2011 is evenly divided on the chances of below-average, average, or above-average rainfall. Perhaps counter-intuitively, this forecast distribution does not mean that “near normal” is the best forecast, but rather that there are equal chances for each of the three categories. Based on persistence and similar climatic conditions last year, the PEAC Center will make an educated guess that rainfall will be near normal to slightly below normal during the last two months of 2011 through at least the first quarter of 2012. No adverse tropical cyclone activity is expected for Kosrae State during the remaining months of 2010.

During La Niña, the sea level typically rises above normal. For the next three to six months, above-normal sea level could exacerbate inundation and coastal erosion during episodes of high surf. Areas prone to wave splash and inundation at high tide are likely to experience more than usual erosive wave action.

Predicted rainfall for Kosrae State from October 2011 through September 2012 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²
October – December 2011	95% (44.27 inches)
January – March 2012	90%
April – June 2012	110%
July - September 2012	100%

² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.



Republic of Palau: Most recording locations throughout the Republic of Palau were very wet during the 3rd Quarter of 2011. The 3rd Quarter total rainfall of 76.08 inches was the highest 3-month rainfall total throughout Micronesia. The WSO Koror had the region's 2nd highest 3-month total of 70.61 inches (see Fig. 1). Locations on nearby Yap Island ranked third highest in the region. The WSO Koror had more than 20 inches of rain in each month from May through September. This is the first time in Koror's 55-year climatic record for a run of 5 consecutive months to exceed 20 inches. Most recently, there were three consecutive months of 20-plus inches of rain during June, July, and August of 2007.

Republic of Palau Rainfall Summary 3rd Qtr 2011						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predicted ¹
WSO Koror	Inches	28.22	20.94	21.45	70.61	44.85
	% Norm	156%	140%	181%	157%	100%
Nekken	Inches	16.30	20.45	9.16	45.91	44.85
	% WSO	90%	137%	77%	102%	100%
Intl. Airport	Inches	27.33	24.68	24.07	76.08	44.85
	% WSO	138%	150%	184%	154%	100%
Peleliu	Inches	22.28	16.94	14.86	54.08	44.85
	% WSO	130%	119%	132%	127%	100%

¹ Predictions made in 2nd Quarter 2011 newsletter.

4th Quarter, 2011

LOCAL SUMMARY AND FORECAST

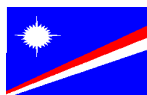
Persistent monsoonal southwest winds, and a parade of tropical disturbances passing to the north of Palau contributed to incessant heavy rainfall in Palau for many months.

Climate Outlook: With La Niña once again in control of the Pacific Basin climate, the Republic of Palau should remain wetter than normal for the foreseeable future. With the recent collapse of western North Pacific tropical cyclone activity, we would expect low odds (5%) for a damaging tropical cyclone to affect any location in the Republic of Palau for the remainder of the year. That being said, Palau, Yap State, Guam and the CNMI are the only locations in Micronesia that have a non-negligible chance to be affected by a named tropical cyclone for the remainder of 2011 through early 2012.

Predicted rainfall for Palau from October 2011 through September 2012 is as follows:

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²
October – December 2011	125% (46.70 inches)
January – March 2012	120%
April – June 2012	120%
July – October 2012	120%

² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.

**Republic of the Marshall Islands (RMI):**

Most atolls of the RMI have had normal to above-normal rainfall for the past 6 to 9 months. The 40.06 inches of rainfall at the Majuro WSO during the 3rd Quarter was 108% of normal. Further north, at Kwajalein, the 36.27 inches of rain during the 3rd Quarter was 112% of normal. Other stations near the Majuro WSO (e.g., Laura and Arno) were just a bit above normal with 3rd Quarter totals of 104% and 103% of normal, respectively. The long-term climate records at Kwajalein and at Majuro (which begin in the early 1950s) show a long slow decline of mean annual rainfall that is statistically significant. Recent abundant rainfall in 2010 and 2011 has created a small upward bulge on the recent end of the long-term rainfall time series, but has not been sufficient to nullify the significance of the drying trend at these islands. The downward trend of annual rainfall is such that there is a loss of nearly 20 inches of annual rainfall during the 2000s versus the 1950s. At Kwajalein, the loss of annual rainfall over the same 6-decade time period is approximately 14 inches. Most locations in the islands of Hawaii are also experiencing a similar long-term decline of rainfall.

Climate Outlook: With the return of La Niña, a weather pattern similar to that seen throughout 2008 and 2010 has developed in the western North Pacific. This pattern features widespread easterly low-level winds throughout Micronesia, cool SST along the equator south and east of the RMI, and tropical cyclone activity pushed far to the west of normal. In this pattern, the rather narrow trade-wind convergence zone dominates the weather of the RMI. During 2008, this type of anomalous weather pattern was accompanied by below-normal rainfall at most of the RMI throughout that year. During 2010, however, abundant rainfall occurred at most locations. This difference was

LOCAL SUMMARY AND FORECAST

RMI Rainfall Summary 3rd Qtr 2011						
Station		Jul.	Aug.	Sep.	3rd Qtr	Predicted ¹
RMI Central Atolls (6° N - 8° N)						
Majuro WSO	Inches	14.56	12.63	12.87	40.06	36.94
	% Norm	112%	110%	104%	108%	100%
Laura	Inches	15.90	10.48	11.97	38.35	36.88
	% Norm	122%	91%	96%	104%	100%
Aling-laplap	Inches	15.43	14.11	7.51	37.05	34.67
	% Norm	132%	130%	62%	107%	100%
Arno	Inches	13.64	13.11	11.17	37.92	36.94
	% Norm	105%	114%	90%	103%	100%
RMI Northern Atolls (North of 8° N)						
Kwajalein	Inches	10.27	10.05	11.95	36.27	36.27
	% Norm	98%	140%	101%	112%	100%
Wotje	Inches	8.41	7.71	7.33	23.45	28.80
	% Norm	85%	80%	65%	76%	100%
Utirik	Inches	5.82	9.12	N/A	N/A	32.38
	% Norm	66%	106%	N/A	N/A	100%

¹ Predictions made in 2nd Quarter 2011 newsletter.

likely due to the location of the Tropical Upper Tropospheric Trough (TUTT), which produced more favorable upper-level wind patterns during 2010. Considering the overwhelming long-term drying trend, persistence, and computer guidance indicating near-normal rainfall for the next three months, we anticipate near-normal rainfall throughout the RMI for at least the next three months.

Because strong low-level easterly winds are expected to persist across Micronesia and the equatorial Pacific, the sea level should remain higher than normal and may rise further in the RMI and at other locations in Micronesia. Higher-than-normal sea level will expose the atolls of the RMI to a heightened risk of coastal inundation, especially during late November 2011 through February 2012, when enhanced trade winds and the extra-tropical low pressure systems that move eastward from Japan are two sources of large swell that episodically impact the atolls of the RMI. Any large wave event (> 12 ft) coupled with higher-than-normal sea level poses an enhanced risk of coastal inundation.

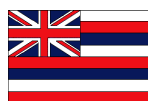
Predicted rainfall for the RMI from October 2011 through September 2012 is as follows:

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LOCAL SUMMARY AND FORECAST

Inclusive Period	% of long-term average / Forecast rainfall (inches) ²		
	South of 6°N	6°N to 8°N	North of 8°N
Oct – Dec 2011 (End of Rains)	100% (38.05 inches)	100% (38.04 in)	95% (28.63 in)
Jan – March 2012 (Dry Season)	100%	95%	95%
April – June 2012 (Onset of Rains)	100%	100%	100%
July – Sept 2012 (Rainy Season)	100%	110%	100%

² Forecast rainfall quantities represent BEST ESTIMATES given the probabilistic forecast for each particular season and station.



Hawaii: The state of Hawaii has been very dry during the 3rd Quarter of 2011. Below-normal rainfall and warm weather has increased the drought intensity over leeward areas of the state. The Waimanalo Reservoir on Oahu has been rapidly decreasing and has dropped over 25 feet since early this year. Mandatory water restrictions will be implemented if this drop continues. As far as drought conditions go: On the Big Island and on Maui, drought area conditions have declined. Pastures, ranching operations and water supplies have been negatively affected. Molokai and Lanai have reported no significant changes in the past month, however, general vegetation degradation and cutbacks in irrigation water consumption continue. Kauai has not reported any drought conditions. The below-normal rainfall has continued into October in the state of Hawaii with Honolulu, Kahului, and Hilo receiving only 19%, 18%, and 48% normal rainfall respectively.

Most locations in the islands of Hawaii are also experiencing a similar long-term decline of rainfall. Cloud formation by trade winds is the most reliable and abundant source of water in the Hawaiian Islands. However, rainfall in Hawaii has been steadily declined over the past twenty years.

Climate Outlook: The long lead Hawaiian Islands Outlook issued on October 20 by the NOAA Climate Prediction center indicated that probabilities favored above-normal precipitation during early 2012 as part of a forecasted mature phase of La Niña. The next long-lead outlook will be issued by the Climate Prediction Center on November 17th.

State of Hawaii Rainfall Summary 3rd Qtr 2011					
Station		July	Aug.	Sep.	3rd Qtr
Lihue Airport	Inches	1.45	1.18	0.79	3.42
	% Norm*	86%	64%	41%	63%
Honolulu Airport	Inches	0.57	0.07	0.07	0.71
	% Norm*	158%	37%	12%	62%
Kahului Airport	Inches	0.63	0.19	0.08	0.90
	% Norm*	166%	40%	42%	86%
Hilo Airport	Inches	5.18	8.74	4.45	18.37
	% Norm*	54%	104%	48%	68%

* Hawaii normals are computed from 1981-2010 data.

4th Quarter, 2011

Seasonal Sea-Level Outlook for the US-Affiliated Pacific Islands

The following sections describe: (i) the *Canonical Correlation Analysis (CCA)* forecasts for seasonal (mean and maxima) sea-level deviations for the forthcoming seasons OND, NDJ, and DJF of 2011, (ii) the observed monthly mean and maximum sea-level deviations for the season JAS 2011, and (iii) forecast verifications for JAS 2011 (observed/forecast values) and discussion. *Note that the deviations are defined as 'the difference between the mean sea level for the given month and the 1975 through 1995 mean sea level value computed at each station'. Also note that the CCA-forecasting technique adapted here does not account for sea-level deviations created by other atmospheric or geological factors such as tropical cyclones, storm surges or tsunamis.*

(i) **Seasonal sea level forecast** (*deviations with respect to climatology*) for OND, NDJ, and DJF of 2011

Forecasts of the sea-level deviations in the USAPI (see <http://www.prh.noaa.gov/peac/map.php> for locations of stations) are presented using CCA statistical model. Based on the independent SST values in JAS 2011, the resulting CCA model has been used to forecast the sea-level of three consecutive months: OND, NDJ, and DJF (see Table 1: left panel shows values for seasonal mean while the right panel shows the seasonal maxima). The forecast values of sea-level for OND, NDJ, and DJF displays a positive deviation in the vicinity of north and south Pacific Islands. All stations are likely to record higher than normal sea level during this time period. CCA cross-validated results show that forecasts are very skillful (at 0 to 2-months lead time) for the three consecutive seasons (Table 1: bottom panel). The just ended 2010 /11 La Nina condition has returned and the atmospheric component of this event is active. Consistent with this La Nina impact (i.e., enhanced trade winds), the sea level in these islands is already higher than normal. It may rise further in the months to come.

Table 1: Forecasts of sea-level deviation (in inches) for Oct-Nov-Dec, Nov-Dec-Jan, and Dec-Jan-Feb 2011.

Tide Gauge Station	Seasonal Mean Deviations ¹				Seasonal Max Deviations ²					
	OND	NDJ	DJF	Forecast Quality ³	OND	NDJ	DJF	Forecast Quality ³	Return Period ⁴ for OND Season	
Lead Time ⁵	0	1M	2M		0	1M	2M		20 Year	100 Year
Marianas, Guam	+4	+4	+4	V. Good	+21	+20	+20	Good	6.5	9.1
Malakal, Palau	+4	+3	+3	V. Good	+40	+39	+39	V. Good	6.1	6.4
Yap, FSM	+3	+2	+2	V. Good	+31	+30	+29	V. Good	8.2	11.0
Chuuk, FSM**	+3	+2	+2	N/A	+30	+30	+30	N/A	N/A	N/A
Pohnpei, FSM	+4	+4	+4	V. Good	+36	+36	+36	V. Good	9.1	11.8
Kapingamarangi, FSM	+3	+3	+4	Good	+30	+31	+32	Poor	5.7	6.4
Majuro, RMI	+4	+3	+3	V. Good	+44	+44	+45	V. Good	6.6	8.4
Kwajalein, RMI	+3	+2	+2	V. Good	+41	+41	+41	V. Good	4.9	6.1
Pago Pago, Am. Samoa	+4	+3	+3	Good	+27	+27	+28	Good	3.0	3.7
Honolulu, Hawaii	+1	+1	0	Fair	+21	+21	+20	Fair	3.2	5.2
Hilo, Hawaii	+2	+1	-1	Fair	+24	+25	+23	Fair	5.5	6.8

Note: (-) indicates negative deviations (fall of sea level from the mean), and (+) indicates positive deviations (rise of sea level from the mean); N/A: data not available. Deviations from -1 to +1 inch are considered negligible, and deviations from -2 to +2 inches are unlikely to cause any adverse climatic impact. Forecasts for Chuuk (**) are estimated subjectively based on information from WSO Chuuk and observations from neighboring stations of Pohnpei and Yap. See http://www.prh.noaa.gov/peac/peu/2011_4th/sea_level.php#footnote for explanations of footnotes 1 through 5.

Remarks: As compared to the previous seasons, the forecasts values of sea level for OND, NDJ, and DJF seasons (2011-12) (Table 1: above) indicate a positive trend (3-5 inches rise) in the months to come. Currently all of these stations show about 2-9 inches higher-than-normal sea level.

Despite an elevated sea level of about 3-5 inches higher than normal in the forthcoming seasons, the forecasts clearly indicate that a further rise is also possible. This rising trend is supportive to on-going La Niña condition. According to CPC, La Niña conditions are expected to gradually strengthen and continue through the Northern Hemisphere winter 2011-12.

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Seasonal Sea-Level Outlook for the US-Affiliated Pacific Islands

(ii) Observed Monthly Sea Level Deviation in July-August-September (JAS) 2011

The monthly time series (July to September 2011) for sea level deviations have been taken from the UH Sea Level Center. The full time series (in mm) for monthly mean is available at: <ftp://ilikai.soest.hawaii.edu/islp/slpp.deviations>. Locations of these stations can be found at: <http://www.prh.noaa.gov/peac/map.php>.

Table 2 : Monthly observed max/mean sea level deviations in inches (year-to-year standard deviation in parentheses)

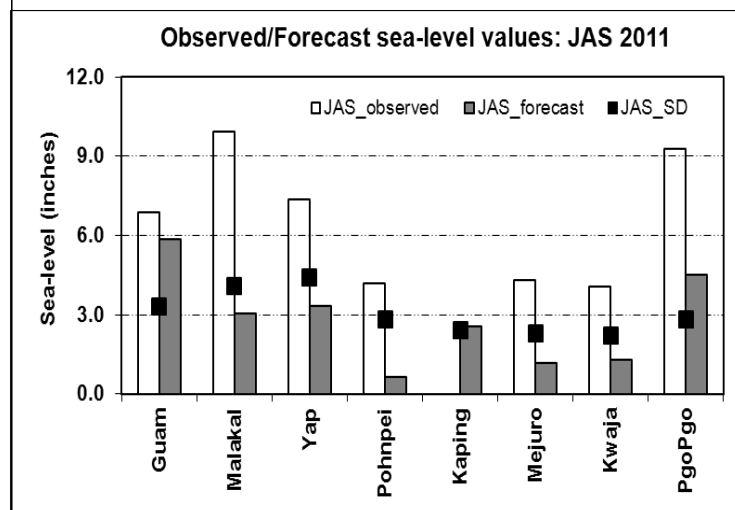
Tide Gauge Station	Monthly Mean Deviations ¹				Monthly Max Deviations ²			
	July	Aug.	Sept.	Standard Deviations	July	Aug.	Sept.	Standard Deviations
Marianas, Guam	*	+7.6	+6.2	3.3	*	+23	+24	3.4
Malakal, Palau	*	+9.0	+11.0	4.1	+44	+46	+48	4.3
Yap, FSM	+6.1	+7.2	+8.9	4.4	+31	+37	+37	4.0
Chuuk, FSM**	*	*	*	*	*	*	*	*
Pohnpei, FSM	+6.9	+5.9	*	2.8	+36	+33	*	3.3
Kapingamarangi, FSM	*	*	*	2.4	*	*	*	2.6
Majuro, RMI	+4.5	+4.1	*	2.3	+43	+45	*	3.0
Kwajalein, RMI	+5.2	+4.2	+2.9	2.2	+43	+42	+41	2.8
Pago Pago, American Samoa	+8.7	*	+9.9	2.8	+30	+33	+35	3.3
Honolulu, Hawaii	+2.1	+2.2	+1.3	1.9	+22	+20	+18	2.3
Hilo, Hawaii	+1.0	+2.8	*	1.8	+25	+26	*	2.4

* Data currently unavailable; ¹ Difference between the mean sea level for the given month and the 1975 through 1995 mean sea level value at each station; ² Same as ¹ except for maxima; SD stands for standard deviations.

Remarks: As compared to August 2011, the monthly mean sea level in September 2011 shows rise in some stations (Malakal, Pago Pago) and fall in other stations (Guam, Kwajalein, and Honolulu). It may be mentioned that during the month of June 2011, sea level in most of the stations recorded fall. In July, sea level of a few stations recorded rise, and in August sea level of all stations (except Kwajalein) recorded rise. Again in September, some stations recorded rise and others recorded fall. Currently, the sea level at all stations and in the North Pacific are 2-9 inches higher than normal. The monthly maxima also displayed similar trends. These trends are supportive to on-going La Niña condition.

(iii) Forecast Verification (Seasonal Mean) for JAS 2010

Figure 1: Observed/forecast seasonal sea-level deviations



Remarks: The observed and forecasted values for the previous season JAS is presented to the left. Unlike other seasons, the forecasts in JAS are less skillful. Most of the stations are under forecasted. The probable reason for this dismay is that the CCA model forecasts for JAS, ASO, and SON were ENSO-neutral based (which corresponds to normal sea level in the USAPI region), as ENSO-neutral conditions prevailed at that time. Based on information from different global climate centers, this ENSO-neutral condition was also expected to continue. So, our model was influenced by ENSO-neutral conditions. As La Niña conditions (which correspond to higher sea level in the USAPI region) returned to the atmosphere suddenly, we started to see unexpected higher sea level. This added to stronger than expected atmospheric component (as explained in the last quarter's newsletter) may be a cause for the recent forecast anomaly. One possible explanation is that the recent trend of enhanced trade winds west of the dateline is partly responsible for this rise. Whether these enhanced trade winds are abnormal or a longer-term trend remains an open question.

Pacific ENSO Update

Excerpts from El Niño/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION

Issued by NOAA NWS Climate Prediction Center - 6 October 2011

http://www.cpc.noaa.gov/products/analysis_monitoring/enso_advisory/index.shtml

ENSO Alert System Status: La Niña Advisory

Synopsis: La Niña conditions are expected to gradually strengthen and continue through the Northern Hemisphere winter 2011-12.

During September 2011, La Niña conditions strengthened as indicated by increasingly negative sea surface temperature (SST) anomalies across the eastern half of the equatorial Pacific Ocean. The weekly Niño indices continued their cooling trend and all are currently at or below -0.5°C . Consistent with this cooling, oceanic heat content (average temperature anomalies in the upper 300m of the ocean) remained below-average in response to a shallower thermocline across the eastern Pacific Ocean. Also, convection continued to be suppressed near the Date Line, and became more enhanced near Papua New Guinea. In addition, anomalous low-level easterly and upper-level westerly winds persisted over the central tropical Pacific. Collectively, these oceanic and atmospheric patterns reflect the continuation of La Niña conditions.

Currently, La Niña is not as strong as it was in September 2010. Roughly one-half of the models predict La Niña to strengthen during the Northern Hemisphere fall and winter. Of these models, the majority predict a weak La Niña (3-month average in the Niño-3.4 region less than -0.9°C). In addition, a weaker second La Niña winter has occurred in three of the five multi-year La Niñas in the historical SST record since 1950. However, the NCEP Climate Forecast System (CFS.v1) predicts a moderate-strength La Niña this winter (between -1.0°C to -1.4°C) and CFS.v2 predicts a strong La Niña (less than -1.5°C), which rivals last year's peak strength. For CFS forecasts made at this time of year, the average error for December-February is roughly $\pm 0.5^{\circ}\text{C}$, so there is uncertainty as to whether this amplitude will be achieved. Thus, at this time, a weak or moderate strength La Niña is most likely during the Northern Hemisphere winter.

Across the contiguous United States, temperature and precipitation impacts associated with La Niña are expected to remain relatively weak during the remainder of the Northern Hemisphere early fall, and to strengthen during the late fall and winter. It is important to note that the strength of U.S. impacts is not necessarily related to the strength of La Niña across the equatorial Pacific. During October-December 2011, there is an increased chance of above-average temperatures across the mid-section of the country. Also, above-average precipitation is favored across the Pacific Northwest, along with a higher probability for drier-than-average conditions across much of the southern tier of the country.

The Pacific ENSO Update is a bulletin of the Pacific El Niño-Southern Oscillation (ENSO) Applications Climate (PEAC) Center. PEAC conducts research & produces information products on climate variability related to the ENSO climate cycle in the U.S.-Affiliated Pacific Islands (USAPI). This bulletin is intended to supply information for the benefit of those involved in such climate-sensitive sectors as civil defense, resource management, and developmental planning in the various jurisdictions of the USAPI.

The Pacific ENSO Update is produced quarterly both online and in hard copy, with additional special reports on important changes in ENSO conditions as needed. For more information about this issue please contact the editor, LTJG Charlene Felkley, at peac@noaa.gov or at the address listed below.

PEAC is part of the Weather Forecast Office (WFO) Honolulu's mission and roles/responsibilities. All oversight and direction for PEAC is provided by the Weather Forecast Office Honolulu in collaboration with the Joint Institute for Marine and Atmospheric Research (JIMAR) at the University of Hawaii. Publication of the Pacific ENSO Update is supported by the National Oceanic and Atmospheric Administration (NOAA), National Weather Service-Pacific Region Climate Services. The views expressed herein are those of the authors and do not necessarily reflect the views of NOAA, any of its sub-agencies, or cooperating organizations.

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Dr. Rashed Chowdhury, Principal Research Scientist, at 808-956-2324 for information on ENSO and sea-level variability in the USAPI.

Duncan Gifford, Graduate Research Assistant, at 808-956-2324 for information related to the PEAC website.

University of Hawai'i - Joint Institute of Marine and Atmospheric Research (JIMAR), School of Ocean and Earth Science and Technology (SOEST), Department of Meteorology:

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Dr. Tom Schroeder, PEAC Principal Investigator at 808-956-7476 for more information on hurricanes and climate in Hawai'i.

NOAA National Weather Service

Weather Forecast Office (WFO) Honolulu:

HIG #250, 2525 Correa Rd., Honolulu, HI, 96822
Raymond Tanabe, PEAC Director, at 808-973-5270

NOAA National Weather Service

Weather Forecast Office (WFO) Guam:

3232 Hueneme Road, Barrigada, Guam, 96913
Chip Guard, Warning Coordination Meteorologist, at 671-472-0900 for information on tropical cyclones and climate in the USAPI.

University of Guam - Water and Environmental Research Institute (WERI):

UOG Station, Mangilao, Guam 96913
Dr. Mark Lander, PEAC Meteorologist, at 671-735-2685 for information on tropical cyclones and climate in the USAPI.